

CLAIMS:

1. A method of adjusting a radio frequency signal produced by radio frequency circuitry in response to receipt of phase and amplitude control signals from digital baseband circuitry which operates to convert digital data signals into such phase and amplitude control signals, wherein the phase and amplitude control signals are adjusted in the digital baseband circuitry in order to compensate for time alignment errors which occur in the radio frequency circuitry.

2. A method as claimed in claim 1, wherein the time alignment errors in the radio frequency signal are detected by comparing phase and amplitude components of the radio frequency signal with phase and amplitude control signals produced by the digital baseband circuitry.

3. A method as claimed in claim 2, wherein the phase and amplitude control signals are adjusted in dependence upon the comparison of phase and amplitude components of the radio frequency signal with phase and amplitude control signals produced by the digital baseband circuitry.

4. A method of adjusting timing of amplitude and phase components in an output RF signal, the method comprising:

generating amplitude and phase signals from input data;

adjusting the generated amplitude and phase signals to produce adjusted amplitude and phase signals;

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supplying the adjusted amplitude and phase signals to a radio frequency circuit; and

transmitting an output RF signal from the radio frequency circuit, wherein adjusting the generated amplitude and phase signals comprises:

detecting an output RF signal to produce detected amplitude and phase signals;

subjecting the generated phase signal to a first time delay to produce a delayed phase signal, the first time delay being such as to minimise a difference between the delayed phase signal and the detected phase signal;

subjecting the generated amplitude signal to a second time delay to produce a delayed amplitude signal, the second time delay being such as to minimise the difference between the delayed amplitude signal and the detected amplitude signal; and

adjusting the generated amplitude and phase signals in dependence upon the first and second time delays.

5. A method as claimed in claim 4, wherein the adjusted amplitude and phase signals are converted to inphase and quadrature (I and Q) signals for supply to the radio frequency circuit.

6. A method of adjusting a radio frequency signal produced by radio frequency circuitry in response to receipt of inphase and quadrature (I and Q) control signals from digital baseband circuitry which operates to convert digital data signals into such inphase and quadrature (I and Q) control signals, wherein the inphase and quadrature (I and Q) control signals are adjusted in the digital baseband circuitry in order to compensate for time alignment errors which

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occur in the radio frequency circuitry.

5           7. A method as claimed in claim 6, wherein the time alignment errors in the radio frequency signal are detected by comparing inphase and quadrature (I and Q) components of the radio frequency signal with inphase and quadrature (I and Q) control signals produced by the digital baseband circuitry.

10           8. A method as claimed in claim 7, wherein the inphase and quadrature (I and Q) control signals are adjusted in dependence upon the comparison of inphase and quadrature (I and Q) components of the radio frequency signal with inphase and quadrature (I and Q) control signals produced by the digital baseband circuitry.

15           9. A method of adjusting timing of inphase and quadrature (I and Q) components in an output RF signal, the method comprising:

20           generating inphase and quadrature (I and Q) signals from input data;

25           adjusting the generated inphase and quadrature (I and Q) to produce adjusted inphase and quadrature (I and Q) signals;

          supplying the adjusted inphase and quadrature (I and Q) signals to a radio frequency circuit; and

30           transmitting an output RF signal from the radio frequency circuit, wherein adjusting the generated inphase and quadrature (I and Q) signals comprises:

          detecting an output RF signal to produce detected inphase and quadrature (I and Q) signals;

35           subjecting the generated inphase (I) signal to a first time delay to produce a delayed inphase (I) signal, the first time delay being such as to minimise

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a difference between the delayed inphase (I) signal and the detected inphase (I) signal;

subjecting the generated quadrature (Q) signal to a second time delay to produce a delayed quadrature (Q) signal, the second time delay being such as to minimise the difference between the delayed quadrature (Q) signal and the detected quadrature (Q) signal; and

adjusting the generated inphase and quadrature (I and Q) signals in dependence upon the first and second time delays.

10. A method as claimed in claim 9, wherein the adjusted inphase and quadrature (I and Q) signals are converted to phase and amplitude signals for supply to the radio frequency circuit.

11. A radio frequency transmitter which includes digital baseband circuitry operable to produce phase and amplitude control signals at a first frequency from input digital data signals, the transmitter also including radio frequency circuitry operable to output radio frequency signals in dependence upon phase and amplitude control signals or upon inphase and quadrature (I and Q) signals received from the digital baseband circuitry, wherein the digital baseband circuitry is operable to correct the phase and amplitude control signals for time alignment errors that occur in the radio frequency circuitry.

12. A transmitter as claimed in claim 11, wherein the digital baseband circuitry includes means for comparing phase and amplitude components of an RF signal with delayed phase and amplitude control signals, and is operable to adjust the phase and amplitude control signals in dependence upon the result

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of the comparison.

13. Apparatus for adjusting timing of phase and amplitude components of an RF signal, the apparatus comprising:

an RF detector unit for detecting an RF signal and operable to produce detected phase and amplitude signals therefrom;

an adjustment unit connected to receive generated phase and amplitude signals and operable to output adjusted phase and amplitude signals in dependence upon received adjustment control signals;

a delay unit connected to receive the generated phase and amplitude signals and operable to delay those signals by respective time delays to produce delayed phase and amplitude signals, the respective time delays being determined such that respective differences between detected and delayed phase and amplitude signals are minimised; and

a delay calculation unit which is operable to generate adjustment control signals in dependence upon the respective time delays and to supply the adjustment control signals in dependence upon respective time delays and to supply the adjustment control signals to the adjustment unit.

14. A radio frequency transmitter which includes digital baseband circuitry operable to produce inphase and quadrature (I and Q) control signals at a first frequency from input digital data signals, the transmitter also including radio frequency circuitry operable to output radio frequency signals in dependence upon inphase and quadrature (I and Q) control signals or upon amplitude and phase signals received from the digital baseband circuitry, wherein

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the digital baseband circuitry is operable to correct the inphase and quadrature (I and Q) control signals for time alignment errors that occur in the radio frequency circuitry.

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15. A transmitter as claimed in claim 14, wherein the digital baseband circuitry includes means for comparing inphase and quadrature (I and Q) components of an RF signal with delayed inphase and quadrature (I and Q) control signals, and is operable to adjust the inphase and quadrature (I and Q) control signals in dependence upon the result of the comparison.

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16. Apparatus for adjusting timing of inphase and quadrature (I and Q) components of an RF signal, the apparatus comprising:

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an RF detector unit for detecting an RF signal and operable to produce detected inphase and quadrature (I and Q) signals therefrom;

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an adjustment unit connected to receive generated inphase and quadrature (I and Q) signals and operable to output adjusted inphase and quadrature (I and Q) signals in dependence upon received adjustment control signals;

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a delay unit connected to receive the generated inphase and quadrature (I and Q) signals and operable to delay those signals by respective time delays to produce delayed inphase and quadrature (I and Q) signals, the respective time delays being determined such that respective differences between detected and delayed inphase and quadrature (I and Q) signals are minimised; and

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a delay calculation unit which is operable to generate adjustment control signals in dependence upon the respective time delays and to supply the adjustment

control signals in dependence upon respective time delays and to supply the adjustment control signals to the adjustment unit.

17. A method of controlling radio frequency circuitry in a mobile telecommunications device comprising a method as claimed in claim 1.

18. A mobile telecommunications device comprising a radio frequency transmitter as claimed in claim 11.

19. A mobile telecommunications device comprising radio frequency circuitry and apparatus as claimed in claim 13.

20. A method of controlling radio frequency circuitry in a mobile telecommunications device comprising a method as claimed in claim 4.

21. A method of controlling radio frequency circuitry in a mobile telecommunications device comprising a method as claimed in claim 6.

22. A method of controlling radio frequency circuitry in a mobile telecommunications device comprising a method as claimed in claim 9.

23. A mobile telecommunications device comprising a radio frequency transmitter as claimed in claim 14.

24. A mobile telecommunications device comprising radio frequency circuitry and apparatus as claimed in claim 16.